

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Application No: 09/740,939
Attorney Docket No: Q62126

IN THE CLAIMS:

This set of claims is a clean set of pending claims 1-31, consolidating any previous versions of pending claims into this single clean version. Changes in this response are shown in the Appendix.

Sub D17
1. (Amended) A time domain reflectometry method for determining properties of a transmission channel, comprising:
generating, at one end of the channel, a plurality of pulses covering different frequency bands,
and
processing, as received signals, the echoes provided by the plurality of pulses at said one end of the channel.

C1
Sub D27
2. (Amended) A method according to claim 1, wherein the generating is performed so that the frequency bands of the plurality of pulses overlap.

3. (Amended) A method according to claim 2, wherein the overlapping of the frequency bands is such that, after reflection and said processing, the frequency spectrum of the plurality of pulses is practically flat.

C2
4. (Amended two times) A method according to claim 1, further comprising:
providing each of the plurality of pulses with a given amplification or attenuation, and
providing pulses of the received signals with the corresponding attenuation or amplification.

5. (Amended two times) A method according to claim 1, further comprising subjecting the received signals to a synchronous averaging.

AMENDMENT UNDER 37 C.F.R. § 1.111

U.S. Application No: 09/740,939

Attorney Docket No: Q62126

6. (Amended two times) A method according to claim 1, further comprising subjecting the received signals to a matched filtering.

7. (Amended two times) A method according to claim 1, further comprising suppressing noise, in medium and high frequency pulses of the received signals, by
estimating the noise for the part of the received signal after the channel end echo, and
determining a threshold above which the received signals are taken into consideration.

8. (Amended two times) A method according to claim 1, wherein the processing of the received signals is performed so that the received signals are processed in their own frequency bands, and then added.

9. (Amended) A method according to claim 8, further comprising detecting the variation with time of one or more of:
the modulus of the received signals, and
the frequency of the received signals.

10. (Amended two times) A method according to claim 1, wherein the generating of the plurality of pulses is performed so as to generate complex analytical pulses.

11. (Amended two times) A method according to claim 1, further comprising selecting the frequency bandwidth and the amplitude of low frequency pulses of the received signals according to the channel attenuation and its compliancy in terms of egress.

12. (Amended two times) A method according to claim 1, wherein the plurality of pulses are generated sequentially or simultaneously.

AMENDMENT UNDER 37 C.F.R. § 1.111

U.S. Application No: 09/740,939

Attorney Docket No: Q62126

13. (Amended two times) A method according to claim 1, wherein at least one of said properties being determined comprises the locations of defects of the channel.

14. (Amended two times) A method according to claim 1, wherein said transmission channel comprises a telephone line between a central office and a subscriber, and the processing of the received signals is performed at the central office.

15. (Amended three times) A method for testing the properties of transmission channels between a central office and a subscriber, comprising using time domain reflectometry to test said properties.

16. (Amended two times) A method according to claim 15, wherein the time domain reflectometry step comprises: generating, at one end of the channel, a plurality of pulses covering different frequency bands, and detecting echoes provided by these pulses at the same end of the line.

17. (Amended three times) An apparatus for testing the properties of transmission channels between a central office and a subscriber, comprising a time domain reflectometry test circuit.

18. (Amended two times) An apparatus according to claim 17, wherein said time reflectometry test circuit comprises: a pulse generator generating a plurality of pulses, at one end of the line, covering different frequency bands, and an echo processor processing the echoes provided by these pulses at the same end of the channel.

AMENDMENT UNDER 37 C.F.R. § 1.111

U.S. Application No: 09/740,939

Attorney Docket No: Q62126

19. (Amended two times) An apparatus according to claim 18, wherein the different frequency bands are overlapping.

20. (Amended two times) An apparatus according to claim 19, wherein said echo processor processes the reflected pulses such that the frequency spectrum is practically flat after reflection and processing.

21. (Amended two times) An apparatus according to claim 18, wherein the pulse generator includes amplification or attenuation for each generated pulse, and said apparatus includes complementary attenuation or amplification for each received pulse.

22. (Amended two times) An apparatus according to claim 18, further comprising a synchronous averager for the received signals.

23. (Amended two times) An apparatus according to claim 18, further comprising a matched filter for the received signals.

24. (Amended two times) An apparatus according to claim 18, further comprising amplification or attenuation for each generated pulse and complementary attenuation or amplification for each received pulse.

25. (Amended two times) An apparatus according to claim 18, further comprising a processor processing the received signals for each frequency band and an adder adding the processed signals.

AMENDMENT UNDER 37 C.F.R. § 1.111

U.S. Application No: 09/740,939

Attorney Docket No: Q62126

26. (Amended two times) An apparatus according to claim 25, further comprising a detector detecting the modulus of the received signals and/or the variation with time of the frequency of the received signals.

27. (Amended two times) An apparatus according to claim 18, further comprising a receiver receiving complex analytical pulses.

28. (Amended two times) An apparatus according to claim 18, further comprising a selector selecting the frequency bandwidth and the amplitude of the low frequency pulses according to the line attenuation and its compliancy in terms of egress.

29. (Amended two times) An apparatus according to claim 18 wherein said pulse generator generates the pulses sequentially or simultaneously.

30. (Amended) A method according to claim 15 wherein said transmission channels are telephone lines comprising copper pairs between a central office and a subscriber, and further comprising a time domain reflectometry test circuit.

31. (Amended) An apparatus according to claim 17 wherein said transmission channels are telephone lines comprising copper pairs between a central office and a subscriber, and further comprising a time domain reflectometry test circuit.